

## Preview:

### Replacement of total mixed ration with fresh alfalfa on productive performance, nutrient utilization, ruminal environment, and methane emissions of dairy cows

G. Fernández-Turren<sup>1</sup>, J. L. Repetto<sup>1</sup>, P. Veliz<sup>1</sup>, J. Montini<sup>1</sup>, J. Bigot<sup>1</sup>, D. Fontes<sup>1</sup>, C. Simón<sup>2</sup>, J. Mariotta<sup>2</sup>, V. Ciganda<sup>2</sup>, C. Cajarville<sup>1</sup>

<sup>1</sup> Facultad de Veterinaria, UdelaR, IPAV, Ruta 1, km 42.5, 80100 Libertad, Uruguay, <sup>2</sup> INIA\_La Estanzuela, Área de Recursos Naturales, Producción y Ambiente, Ruta 50 km 11, Semillero, 70006 Colonia, Uruguay

We evaluated the impact of partially replacing a TMR with fresh alfalfa in lactating cows on intake, digestion, production, and CH<sub>4</sub> emissions. In a crossover-design experiment (29-d experimental period, 21-d adaptation), 12 cows (150 DIM, 545 kg BW, previous lactation: 7000 kg milk), were randomly assigned to T100: 100% TMR, or T60: TMR + fresh alfalfa. The TMR was formulated for 30 kg milk and provided ad libitum in the T100. In the T60, cows were a.m. fed TMR at 60% of the predicted intake and p.m. grazed alfalfa without a limit of quantity. All animals were sampled for rumen environment and CH<sub>4</sub> emissions (SF6 methodology). The intake of DM and nutrients was higher in T100 than in T60 (21 vs. 18 kg DM/d; P<0.001), but no differences were observed in milk production (25 kg/d), milk fat (4.2%), or milk protein (3.4%). Rumen pH was lower (6.2 vs 6.43; P=0.01) and propionic tended to be higher (20.6 vs. 19.8 %; P=0.06) in T100 than in T60, due to the higher starch content. Butyric was lower in T100 (10.5 vs 11.1%, P=0.03), probably due to the higher sugar content of fresh herbage. The cows in T100 emitted less CH<sub>4</sub> related to intake (25 vs. 29 g CH<sub>4</sub>/kg DM, P=0.03; 48 vs. 54 g CH<sub>4</sub>/kg NDF, P=0.04), but there were no differences in CH<sub>4</sub> emitted per day (523 g CH<sub>4</sub>/d), per kg of milk (22 g CH<sub>4</sub>/kg milk), milk protein (628 g CH<sub>4</sub>/kg protein) and milk fat (518 g CH<sub>4</sub>/kg fat). We concluded that the partial substitution of TMR by fresh alfalfa in dairy cows led to a rumen environment similar to that of cows fed only TMR, without increasing CH<sub>4</sub> emissions or negatively affecting milk production.

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Presenting author: Cecilia Cajarville ccajarville@gmail.com

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